

central off the west coast of Washington Territory, Portland barometer 0.25 in. below the normal, a fall of 0.26 in. in 8 hours. The barometer continued to fall rapidly in Oregon and Washington Territory, a fall of 0.32 in. in 8 hours being reported from Olympia at the afternoon observation. The depression extended itself rapidly to the eastward, and at the midnight report the barometer at Virginia City, Montana, was 0.39 in. below the normal.

INTERNATIONAL METEOROLOGY.

Three International Charts, Nos. IV, V and VI, accompany the present *Review*. No. IV indicates the probable course of low pressure areas over the North Atlantic Ocean and neighboring waters and continents from the latter part of July to the end of August, 1879, and is based upon data received at this office up to Sept. 30th, 1879. As the title implies, it is not intended for this chart to be considered as anything more than approximately correct, and it is probable that fuller data will change portions of it. Nos. V and VI are based upon the International Simultaneous Observations as described in the *Review* for July, 1879, supplemented by such other observations as have been considered sufficiently trustworthy. Among the latter may be mentioned the observations made on board vessels over the North Atlantic Ocean and published in the Monthly Weather Review of the German Naval Observatory, which have been specially valuable in the tracing of tracks on Chart No. VI.

On Chart No. IV, the tracks of twelve areas of low pressure are traced, and in the upper right-hand corner is a small index giving the first and last dates of each area. Areas No. I, IV, VI, X, and XI are prolonged tracks of areas that have already appeared on Charts No. I of July and August *Reviews*, and should, in accordance with the explanatory note at the foot of map, have been printed partly in black, but owing to an oversight have been printed wholly in red. Three of these, Nos. I, VI, and XI, probably crossed the Atlantic as indicated and materially affected the weather of northwestern Europe during the month of August. Nos. II, III, VIII and IX can not at present be traced further than shown on map. No. V probably existed on the North Carolina coast on August 9th, and moving northeastward produced hurricane winds off the coast of Nova Scotia on the 10th and 11th. No. VI is identical with area No. VII, Chart I, *August Review*; reports already received indicate that this storm existed on the 13th, about in the position shown. On this day (13th) a vessel in 20° N., 60° W., reported rapidly falling pressure, easterly winds, thunder, lightning, and rain, the day ending with heavy squalls, torrents of rain, and severe lightning. At St. Thomas during the 13th, cirrus clouds moved rapidly from the east, and at 1 a. m. of the 14th, heavy rain, thunder, and lightning occurred. Observations made on the island of Grand Turk (21° 32' N., 71° 10' W.) at 10 a. m. give the lowest barometric pressure (29.75) of the month on the 15th, accompanied by a strong NE wind and heavy rains; the latter ranging from 2.10 to 2.23 inches, or about one-half of the entire rain-fall of the month, at Cockburn Harbor, Salt Cay, and Grand Turk. During the day the wind changed to a heavy SE gale, during which the brig "Helen," lying at East Harbor, Turk's Island, loaded and ready for sea, was obliged to ship her chains, after which she drifted ashore. At Santiago de Cuba, heavy showers fell during the night of the 15th and on the 16th, with SE. squalls. On the 16th, Brig "Dashaway" had a severe hurricane, lasting 10 hours, when 20 miles east of Watling's Island, and Steamer Pomona (from Jamaica to New York, and on the 14th, in 19° 45' N, 75° 50' W) reports, 16th, had hurricane from NE. to SSW., blowing with great violence, and a very heavy cross sea, lasting 13 hours. From the 17th to the 19th, this storm was fully described in the *August Review*; it has not been traced after the 20th, on which day it was over Newfoundland. Nos. VII and XII are based upon the reports of severe storms on the dates and in the positions indicated. No. X is a prolongation of area No. IX, Chart I, *August Review*; it was encountered by Bark Elvira, when 50 miles east of the Alacran Reefs. This vessel reports a severe cyclone from ENE on the 20th, which ended next day at 4 p. m. with wind SSE; it was attended by very high seas and terrific squalls. The heavy rains, reported to have ruined the corn crop, in the State of Tabasco, Mexico, may have accompanied this storm. From the 22nd to the 26th, this storm is fully described in the *August Review*—and as there indicated, it probably continued off the Atlantic coast during the 27th. From the 28th to 31st, it passed northeastward, but does not appear to have been accompanied by very severe winds; on the 29th, the Brig Casarina, 41° N, 66° W, was struck by a "whirlwind, commencing at N. and veering to W. and NE. lasting one hour."

Southern Hemisphere.—Since the publication of the *August Review* the following reports of severe storms in the Southern Hemisphere have been received: *South Atlantic Ocean.*—From June 23rd to 28th, severe storms prevailed along the coast of South America from Montevideo to Cape Horn; at Montevideo the direction of the wind at first (on the evening of the 23rd) was S. by W., hauling to SSE. on the 24th, and backing to SSW. on the 25th; greatest force of wind, estimated, 11 to 12 from the SSE.; barometer fell to 29.78 on the 23rd and to 29.86 on the 25th and heavy rains, with thunder and lightning, fell on the 24th and 25th. It is reported as the heaviest southeaster experienced at Montevideo for years and much damage resulted to the city and to small craft in the inner harbor; bark Syra was driven ashore and lost. Bark Baltimore from England to San Francisco had a strong gale on June 25th, during which a heavy sea threw the vessel on her beam ends, in which position she remained until the 28th when she was in 57° 54' S., 68° 38' W. June 26th, 1879, ship Frank T. Curling, from Liverpool to Callao, encountered heavy gales when off Cape Horn, and, on the 27th, during a lull in the storm the crew abandoned the vessel and, on the morning of the 28th, were taken on board ship John de Costa, barely in time to escape a renewal of storm; the aban-

doned vessel foundered on the 28th 250 miles southwest of Cape Horn. *South Pacific Ocean*.—On June 29th, 1879, severe SE. gales prevailed on the coast of New Zealand, during which ship B. L. and brig Akbar were driven ashore. *Indian Ocean*.—On June 19th, 1879, ship St. Charles, while off south end of Madagascar, had cyclone lasting 12 hours, during which the wind veered from ENE. to SSE. From June 30th to July 7th, severe westerly gales and high seas were experienced off the Cape of Good Hope.

TEMPERATURE OF THE AIR.

The isothermal lines upon Chart No. II., show the general distribution of the temperature for the month of September, 1879, accompanying which is a table of comparative temperatures. The temperature has been decidedly below the normal over the eastern section of the country. This deviation has been least along the immediate Atlantic coast, from Cape May to Eastport, while over Nova Scotia and Cape Breton the temperature has been slightly in excess. Over the Southern States east of the Mississippi and in Arkansas, Missouri, Iowa, Dakota, and northern Michigan, the deviation has ranged from 1° to 2°, while over the Upper Mississippi and Ohio Valleys and larger part of the Lake Region the mean temperature of the month has been from 3° to 4° below the average of the past seven or eight years. Over the northern portion of Texas and Indian Territory and over the Rocky Mountain Region and Western Plateau a decided excess in temperature has occurred, amounting to 5° at Corsicana and on the summit of Pike's Peak; 4°·7 at Salt Lake City; 6°·2 at Virginia City; and 6°·8 at Boise City. The highest and lowest temperatures, as recorded during the month, by the maximum and minimum thermometers in use at the Signal Service stations show the temperature to have risen above 100° over the interior of California, southern portion of Arizona, and interior of Texas; over 90° at stations on the Western Plateau, (except Pioche, 88°) in New Mexico, over the eastern slope of the Rocky Mountains as far north as Nebraska, as well as over portions of Montana and Dakota, along the Gulf and Atlantic coasts and over the western portions of Pennsylvania and New York; to or over 80° at all other stations except Breckenridge, Duluth, St. Paul, Marquette, Escanaba, Grand Haven, and outlying stations on the immediate coast of New England. The highest temperatures occurred in California from the 11th to the 16th; in the Lower Missouri, Upper Mississippi and Lower Ohio valleys, and Upper Lake Region from the 26th to the 30th; elsewhere very generally from the 1st to the 10th. The highest recorded was 113° at Yuma, Arizona. The minima show the temperature to have fallen below 30° from Montana and Wyoming to northern Minnesota and over the northern part of Lower Michigan; below 40° over northern Nevada, Idaho, and from Northern Colorado to the interior of the Middle States and New England, except along the southern shore of Lake Erie; below 50° at elevated stations in California, and from Nevada to New Mexico, Missouri, and northern portions of Georgia and South Carolina; and below 60° at all stations except those in the Lower Rio Grande Valley, along the immediate Gulf coast, and at Jacksonville, Fla. From the Northwest to the Atlantic coast the lowest temperatures were experienced from the 23rd to the 27th; over the Southwest from the 13th to 20th, and over California and the Western Plateau from the 23rd to the 30th. The three lowest recorded were 20° on summit of Pike's Peak; 19° at Pembina; and 11° on the summit of Mt. Washington. Below are given the highest and lowest temperatures observed by Signal Service and voluntary observers, arranged by States, those by voluntary observers being marked with a (*) star.

Minima Temperatures.—*Maine*: 26° at *Orono and 37° at Eastport. *New Hampshire*: 11° at Mount Washington. *Vermont*: 30° at *Lunenburg and *Strafford. *Massachusetts*: 30° at *Amherst, *Rowe, *Walham and 31° at Springfield. *Rhode Island*: 41° at Newport. *Connecticut*: 34° at *Southington. *New York*: 26° at *Nile and 33° at Albany. *Pennsylvania*: 22° at *Wellsboro and 35° at Pittsburgh. *Delaware*: 48° at *Dover. *Maryland*: 34° at *Woodstock, *New Market, *Emmitsburg and 40° at Baltimore. *District of Columbia*: 38° at Washington. *Virginia*: 32° at *Snowville, and 38° at Fort Whipple. *West Virginia*: 39° at Morgantown. *North Carolina*: 36° at *Ashville, *Franklin and 43° at Charlotte. *South Carolina*: 46° at *Spartanburgh and 54° at Charleston. *Georgia*: 44° at Atlanta. *Florida*: 60° at St. Marks. *Alabama*: 46° at *Wilsonville and 53° at Montgomery. *Mississippi*: 57° at Vicksburg. *Louisiana*: 55° at Shreveport. *Texas*: 45° at Davis. *Ohio*: 31° at Westerville and 37° at Columbus. *Kentucky*: 44° at Louisville. *Tennessee*: 42° at Nashville and *Ashwood. *Arkansas*: 45° at *Mount Ida. *Michigan*: 30° at *Thornville, *Lansing, Grand Haven and Alpena. *Indiana*: 34° at *Logansport and *Wabash. *Illinois*: 30° at *Elmira and 39° at Chicago. *Missouri*: 38° at *Corning and 41° at St. Louis. *Kansas*: 32° at *Holton and 43° at Leavenworth. *Wisconsin*: 23° at *Neillsville and 35° at Milwaukee. *Iowa*: 24° at *Ames and 34° at Des Moines. *Nebraska*: 28° at *De Soto and 34° at North Platte. *Indian Territory*: 46° at Fort Sill. *Minnesota*: 24° at Breckenridge. *Dakota*: 19° at Pembina. *Colorado*: 20° at Pike's Peak and 38° at Denver. *New Mexico*: 42° at Santa Fe and La Mesilla. *Wyoming*: 30° at Cheyenne. *Utah*: 33° at *Coalville. *Nevada*: 33° at Winnemucca. *Arizona*: 44° at Prescott. *Idaho*: 36° at Boise City. *California*: 32° at Campo, 47° at Los Angeles, 52° at San Francisco and Sacramento. *Oregon*: 39° at Roseburg.

Maxima Temperatures.—*Maine*: 85° at Portland. *New Hampshire*: 89° at *Grafton. *Vermont*: 85° at Burlington. *Massachusetts*: 89° at Boston. *Rhode Island*: 76° at Newport. *Connecticut*: 82° at New Haven. *New York*: 90° at Rochester and 95° at *Waterburg. *Pennsylvania*: 90° at Pittsburgh and 94° at *Wellsboro. *Delaware*: 82° at *Dover. *Maryland*: 85° at Baltimore. *District of Columbia*: 87° at Washington. *Virginia*: 90° at Norfolk. *West Virginia*: 84° at Morgantown. *North Carolina*: 92° at Wil-

Those marked with * are voluntary reports.